

# Idaho National Engineering and Environmental Laboratory

## ***RECOVERY OF A PRIMARY KAOLIN BY-PRODUCT FROM A MICA PLANT PROCESS WASTE STREAM***

If successful, the waste utilization process developed from this project will have cross-cutting application to numerous industrial mineral operations and deposits in the country. Slimes (waste fines, usually clay type minerals) are rejected and placed in tailing ponds for almost all industrial minerals, including: Barite, Fluorspar, Olivine, Feldspar, Quartz, Spodumene, Phosphate, Potash, Kyanite, Talc, and Vermiculite. Also, fines and clays are quickly becoming a very serious problem to the aggregate and stone industry. Application and use of these fines is considered a national problem in quarries and sand operations, the largest mining industry in the nation. The proposed project would focus on the recovery of a primary kaolin as a by-product from the waste stream of an existing mica processing plant in North Carolina. The management of this waste by-product would minimize the impact on the local environment by reducing required settling pond area and ultimate landfill disposal. This operation is typical of other mineral process plants and the process would be applicable to other industrial mineral producers. A secondary focus of the project would be to segregate the mineral halloysite, which is contained in the primary kaolin product. Halloysite has certain

specific military applications, and as an additive to paint.

### ***Statement of Problem and Technology***

#### ***Concept***

Currently, producers must handle and dispose of mica tailings waste. This problem of waste disposal adds extra cost to the processing of the mica (reducing the realized value per pound of product) and also impacts the local environment near any landfill that is used. This is typical of most industrial mineral processing plants that have slimes waste disposal problems.

***Objective:*** The objective of this project is to conduct both laboratory-scale and pilot-scale test-work to evaluate the feasibility of recovering a primary kaolin as a marketable product from a process stream that is currently considered as a process waste. The primary kaolin product would then be subjected to testing to recover a secondary halloysite product.

#### ***Projected Outcome and***

***Impact:*** The projected outcome of this program would be the creation of additional marketable products for mining companies in the region and the reduction of the area's current waste disposal problems. If successfully

commercialized, new processing facilities would be constructed and provide new jobs. It is expected that the project has an excellent prospect of yielding a kaolin by-product suitable for a commercial market. Developing a process for the production of a halloysite by-product will be much more difficult technically. The commercial value of the halloysite component is much higher than the kaolin and thereby justifies the additional research effort. But, even if the separation of halloysite from the kaolin concentrate is not successful, the kaolin concentrate (including halloysite) is expected to meet market specifications and be saleable.

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